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THE ROLE OF PHYSICIAN GENDER IN THE EVALUATION OF THE NATIONAL CENTERS OF EXCELLENCE IN WOMEN'S HEALTH: TEST OF AN ALTERNATE HYPOTHESIS

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A 2002 evaluation of the National Centers of Excellence in Women's Health (CoE) provided evidence that women receive higher-quality primary health care, as indicated by receipt of recommended preventive care and patient satisfaction, when they receive their care in comprehensive women's health centers. A potential rival explanation for the CoE evaluation findings, however, is that the higher quality of care in the CoE may be attributable to a predominance of female physicians in CoE settings. More women who receive health care in a CoE have a female regular physician and female physicians may provide more preventive health services. Additionally, women may self-select into the CoE because of their preference for female providers. This paper presents results of an analysis examining the role of physician gender in the CoE evaluation. Women seen in three CoE clinics and women seen in other settings in the same communities who had a female physician are compared to assess the CoE effect while controlled for physician gender. The findings confirm a positive CoE effect for many of the quality of care indicators that were observed in the original evaluation. Women seen in CoEs are more likely to receive physical breast examinations and mammograms (ages ≥ 50). In addition, positive CoE findings for counseling on domestic violence, sexually transmitted diseases, family or relationship concerns, and sexual function or concerns were upheld. The CoE model of care delivers advantages to women that are not explained by the greater number of female physicians in these settings.

Keywords: physician gender; women's health care; primary care; prevention

Efforts to improve quality in women's health care have brought attention to the need for primary care that is comprehensive and multidisciplinary, meets a range of needs across a woman's life span, and is delivered in settings sensitive to the realities of women's lives. The Department of Health and Human Services, through the Office on Women's Health, established the National Centers of Excellence in Women's Health (CoEs) program in 1996 to foster the

institutional development of women's health, and to identify and address shortcomings in the delivery of women's primary health care (Office on Women's Health, 2000). Academic centers designated as CoEs were expected to improve the quality of women's primary care by their commitment to a new model of care that would encourage collaboration and coordination among clinicians, fill gaps and reduce redundancies, address women's biopsychosocial needs, and increase awareness of women's health research findings (Office on Women's Health, 2000). Indeed, a recent evaluation of the 15 CoE clinical centers operating in 2001 provides evidence that women seen in the CoEs receive higher quality primary care, as

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indicated by receipt of recommended preventive care and patient satisfaction, compared to women making health care visits to non-CoE sites (Anderson, Weisman, Scholle, Henderson, Oldendick, & Camacho, 2002). The analyses in the benchmark evaluation design were adjusted for key differences between the population of women seen in the CoEs and comparison samples.

Despite the strengths of the main evaluation study, a compelling rival explanation for the positive CoE findings could not be ruled out. Based on prior qualitative and quantitative studies, the authors surmised that the higher quality of care found in the CoEs could be related to the greater availability of female physicians at these CoEs and the possibility that women attending the CoEs prefer seeing a female physician. This article presents additional analyses that were conducted to examine the impact of physician gender and women's preferences for a female physician on the original CoE evaluation results.

Background

The organization of specialized health centers for women represents a structural approach to providing multidisciplinary, comprehensive primary care services for women that began in the 1960s and 1970s with the establishment of community-based health programs focused primarily on women's reproductive health needs (Looker, 1993; Ruzek, 1978). Women's health centers based in hospitals and addressing a broader range of health issues emerged in the 1980s (Weisman, Curbow, & Khoury, 1995). More recently, the Department of Health and Human Services (DHHS) designated 18 academic health centers throughout the United States and Puerto Rico as CoEs to develop standards for comprehensive, multidisciplinary, and culturally competent approaches to women's health across the lifespan (Office on Women's Health, 2000). The model of care promotes "one-stop shopping," in which comprehensive services are colocated in one facility or centers without walls, in which networked services are located in different sites convenient to each other and share a common philosophy of women's health care (Milliken et al., 2001; Weisman & Squires, 2000).

The recent evaluation of the national CoE program provides evidence that modern, center-based models for women's health care, exemplified by the CoE program, offer particular advantages over the conventional array of clinic and center-based services used by women in the community at large (Anderson et al., 2002). The positive results are encouraging to health care researchers and advocates who have worked to define better organizational models for improving quality in women's health care. Quality of care in the

study was defined in terms of receipt of age-appropriate clinical preventive services and satisfaction with care.

Medical textbooks and practice guidelines are defining the scope of women's health care and appropriate preventive services for women, and these standards may be used as a basis for examining quality of care. Most notably, the US Preventive Services Task Force issues evidence-based guidelines for screening tests, counseling, immunizations, and chemoprophylaxis in primary care for patient groups defined by age and gender (US Preventive Services Task Force, 1996). The American College of Obstetricians and Gynecologists (ACOG) provides guidelines for women's primary and preventive care across the lifespan (ACOG, 2002). Additional guidelines pertain to specific conditions, such as heart disease prevention (Mosca et al., 2004). Therefore, the evaluation study compared the levels of recommended clinical preventive services received by women seen in CoE settings to national benchmark data and to a random telephone sample of women living in CoE communities.

Higher proportions of women seen in a CoE reported receiving important reproductive and nonreproductive screening services including the Papanicolaou (Pap) test for cervical cancer (women ≥ 18 years, past 3 years), mammogram (women ≥ 50 years, past year), colon cancer screening (women ≥ 50 years, past 5 years), and physical breast examination (women ≥ 18 years, past year). Counseling in the past year on hormone replacement therapy (women ≥ 40), alcohol and drugs, domestic violence, and sexually transmitted diseases was also higher among women seen in a CoE. Finally, satisfaction with care was assessed using the Primary Care Satisfaction Survey for Women, a recently validated tool for measuring satisfaction in women's primary health care (Scholle, Weisman, Anderson, & Camacho, 2004). Women seen in a CoE were more likely to express a high level of satisfaction with care comprehensiveness and coordination. The findings indicated that the CoE model should be supported and expanded.

The evaluation comparisons were adjusted for age, education, health status, and managed care enrollment to control for differences in the samples that also might impact quality of care. The cross-sectional design utilized in the evaluation, however, is subject to selection bias because women were not randomly assigned to the CoE and the national or community comparison samples. A potential rival explanation for the CoE evaluation findings is that differences in quality of care between the CoE and comparisons may be attributable to a predominance of female physicians in CoE settings, and/or patient selection to female physicians.

The relevance of physician gender to the evaluation study stems from the observation that a higher pro-

portion of physicians practicing at the CoEs are female relative to the overall gender distribution of physicians. In a survey of the 15 CoE clinical centers in operation in 2001, Squires (2002) found most physicians staffing the CoEs were female, with four centers having no male medical staff. The experiences of patients seen in the CoEs could differ markedly from those seen in other settings because of this distinct difference in the composition of the physician workforce.

A growing body of research provides evidence that female physicians practice differently than male physicians and that the style and content of visits differ by physician gender (Roter, Hall, & Aoki, 2002). Reasons for these differences may be related to gender socialized differences between men and women that persist even when professional roles are adopted (Weisman & Teitelbaum, 1985). Specifically, more information is exchanged in a visits to female physicians (Frank & Harvey, 1996; Hall & Roter, 1998; Roter, Lipkin, & Korsgaard, 1991; Roter, Stewart, Putnam, Lipkin, Stiles, & Inui, 1997), women who see female physicians report receiving more preventive clinical screening and counseling care (Andersen & Urban, 1997; Cassard, Weisman, Plichta, & Johnson, 1997; Desnick, Taplin, Taylor, Coole, & Urban, 1999; Franks & Clancy, 1993; Henderson & Weisman, 2001; Kreuter, Strecher, Harris, Kobrin, & Skinner, 1995; Lurie, Margolis, McGovern, Mink, & Slater, 1997; Lurie, Slater, McGovern, Ekstrum, Quam, & Margolis, 1993), and the style of communication is more participatory and includes more information exchange in visits with female physicians (Cooper-Patrick, Gallo, Gonzales, Vu, Powe, Nelson, & Ford, 1999; Hall & Roter, 1998; Kaplan, Gandek, Greenfield, Rogers, & Ware, 1995; Meeuwesen, Schaap, & Van der Staak, 1991). Surveys of physicians also have found that female physicians were more oriented toward prevention than their male colleagues (Bertakis, Helms, Callahan, Azari, & Robbins, 1995; Frank & Harvey, 1996; Maheux, DuFort, Beland, Jacques, & Levesque, 1990). Studies of physician gender and satisfaction with care are less numerous and contradictory. A study based on data from a large managed care organization found lower satisfaction among women who chose to see female physicians (Schmittiel, Grumbach, Selby, & Quesenberry, 2000), whereas a study of women making prenatal visits to obstetrician/gynecologists (OB/GYN) found that satisfaction with female physicians was higher (Roter, Geller, Bernhardt, Larson, & Doksum, 1999).

Studies of physician gender effects do not often account for the influence patients may have on physician practice. A meta-analytic review by Hall, Roter & Aoki (2002) found that female patients interacted differently with female physicians. For example, in observational studies of visits to female physicians,

patients talked more, disclosed more psychosocial information, and were more assertive than in visits to male physicians. With regard to screening, a study investigating patient and physician gender concordance found that female physicians provide more preventive care to both male and female patients, but the effect was most pronounced in visits between female patients and female physicians (Henderson & Weisman, 2001). Thus, physician gender effects may be in part related to the patient's influence on a clinical interaction. Similarly, patients who prefer to see female physicians may have expectations or attitudes that elicit preventive services and counseling. In a study showing lower satisfaction among female patients of female physicians compared to women seeing male physicians, the authors inferred that female physicians may face unique patient expectations when they are actively selected (Schmittiel et al., 2000).

The findings of the original CoE evaluation could have been influenced by physician gender because of its impact on clinical practice and physician-patient interactions. The high percentage of women seeing female physicians could explain the higher preventive screening and counseling rates among women seen at the CoEs. In addition, a threat to internal validity is posed by selection bias if women sought care in a CoE because they wished to be seen by a female physician. Women who prefer seeing female physicians may differ from women who do not express such a preference, and these differences could influence receipt of preventive health care and satisfaction with care. Two alternate hypotheses related to the potential influence of physician gender on the original CoE evaluation findings are examined in this study:

H_{A1}: Higher levels of screening, counseling, and satisfaction with care found in the original CoE evaluation are explained by the higher proportion of women seeing female physicians in CoEs.

H_{A2}: Women choosing to attend CoEs are more likely to prefer seeing female physicians and this preference is a source of selection bias.

Women seeing female physicians and male physicians cannot be directly compared to test the hypotheses because there are insufficient numbers of women seeing male physicians in the CoEs. Instead, quality of care outcomes are compared for women seen in CoE and non-CoE settings for the subset of women who saw female physicians. The original evaluation analyses are replicated on this subsample to test the first hypothesis. To test the second hypothesis, the comparisons are further adjusted for physician gender preference and other covariates that could contribute to a provider selection bias.

Methods

Design

The original CoE evaluation employed a benchmark comparison design to assess whether women seen in CoEs received higher-quality care than women nationwide and compared to women in the same communities. The comparison of care received at the CoEs and in other sites in the same communities was based on a survey that included a comprehensive and comparable set of measures, including items assessing regular physician gender and physician gender preference. The surveys were also conducted concurrently, ensuring greater comparability relative to other benchmarks. For these reasons, the test of the effect of physician gender on the evaluation findings is conducted using the CoE clinic subsample and community comparison samples (described in detail below). A more extensive set of counseling items, including sensitive topics such as sexual concerns, is available for this comparison. The additional topics are analyzed because they may be more likely to be discussed with a female physician (Henderson & Weisman, 2001).

Women receiving care at a CoE are compared to women receiving care at another site in the same community to evaluate the quality of care provided by the CoEs. Ideally, an analysis controlling for physician gender would be conducted to test the hypothesis that physician gender accounted for the higher rates of screening, counseling, and satisfaction in the original CoE evaluation. Not enough women who received care in a CoE, however, reported having a male regular physician. Therefore, the original evaluation analysis, which compared quality of care indicators between the CoE clinic and community comparison samples, is replicated for women who reported having a female regular physician. If a positive CoE effect is observed even when the sample is limited to women with a female physician, there is evidence that original CoE findings were not solely due to physician gender.

In addition to the replication of the original evaluation analyses, the study investigates selection effects. We examine whether women who prefer a female physician differ from women who do not (among women who have a female regular physician) and control for additional covariates related to selection that could not be included in the original evaluation.

The CoE clinic subsample and community comparison sample

Women in three communities served by CoEs were surveyed concurrent to a survey of women attending CoE clinics in the same communities. The three communities were selected to include a diverse patient sample in terms of urban density, socioeconomic status, and region of the United States. The CoEs in

this clinic subsample are at Wake Forest University in Winston-Salem, North Carolina, the University of Michigan in Ann Arbor, Michigan, and Magee Women's Hospital/University of Pittsburgh in Pittsburgh, Pennsylvania. The women attending the CoEs were randomly sampled from a generated list of women who had visited the CoE for any reason in the prior 3 months. For the community comparisons, the sample was collected using random-digit dialing. The women who were contacted by telephone were screened for eligibility. Women were eligible to participate if they were ages 18 and older and had made one primary health care visit in the past year. All surveys were administered by telephone with computer assisted interviewing, and took approximately 15 minutes to complete. The average response rate for the CoE clinic subsample (among eligibles) was 79.8% and the average response rate for the community comparison samples was 55.1%. Completed surveys of approximately 200 women from the CoE and approximately 200 women from the community were pooled for the original evaluation analysis ($N = 1,129$). The subset of women reporting that their regular provider is female is analyzed for the current study ($n = 594$).

Measures

Surveys administered to women in the CoE clinics and the community comparisons included items measuring clinical screening and counseling services, satisfaction with care, physician gender, women's physician gender preference, health care use, and sociodemographic characteristics.

Physician gender and physician gender preference.

Women were asked to indicate whether they had a regular provider and whether that provider is male or female. Women were then asked whether they had a physician gender preference. The response categories for the item were prefer female, prefer male, and no preference. Very few women in either the CoE or comparison group who saw a female physician actually preferred a male physician ($n = 8$). Therefore, women who expressed a preference for a female physician (54.2%) are compared to women who expressed no preference or preferred a male (45.8%).

Quality of care. Quality of care was defined in terms of 1) receipt of age-appropriate clinical preventive services generally recommended for women by such groups as the US Preventive Services Task Force and 2) ratings on a woman-specific measure of primary care satisfaction.

Preventive services. Women were asked, "In the last year have you received a/an (screening service), or not?" Similarly worded items assessed the receipt of

screening services in the past 3 or 5 years. Preventive services assessed for all women ≥ 18 years included routine physical examination, Pap test, physical breast examination, and blood cholesterol test. For women ≥ 50 years, age-appropriate services included mammogram and colon cancer screening. Women were coded yes for the screening services if they had received the service during the past 3 years for all services except cholesterol and colon cancer screening, which were assessed for the past 5 years.

Preventive counseling. Women were asked, "Has a doctor discussed (counseling topic) with you during the last 12 months, or not?" The expanded set of topics included in the CoE clinic and community comparison that were evaluated includes diet and weight; exercise; alcohol or drug use; calcium intake; domestic violence; sexually transmitted disease; family or relationship concerns; and sexual function or concerns. For women ≥ 40 years, counseling on hormone replacement therapy was also measured. Counseling about preventing unintended pregnancy was measured for women ages 18–44.

Patient satisfaction. In the three-community sample, the recently validated Primary Care Satisfaction Survey for Women (PCSSW) was used to assess women's satisfaction with care comprehensiveness and coordination (Scholle, Weisman, Anderson, & Camacho, 2004). The PCSSW was developed through focus groups and cognitive interviews with women from across the country (Anderson et al., 2001; Scholle, Weisman, Anderson, Weitz, Freund, & Binko, 2000), with items addressing topics specific to women (e.g., the chance to get both gynecological and general health care here) and topics important to women, but not gender specific (e.g., the health professional's interest in my mental and emotional health). The PCSSW care comprehensiveness and coordination scale has 10 items which are rated on a 5-point scale from 1 = not at all satisfied to 5 = extremely satisfied. The scale has excellent internal consistency ($\alpha = .95$), discriminates well among women with high versus low comprehensiveness of services, and adds substantially to generic tools in explaining statistical variance in global satisfaction ratings. The mean scale score was obtained by summing the items and dividing by the number of nonmissing items.

Demographics and health care use control variables. Participants verified age and reported race, ethnicity, marital status, employment status, education, income, and whether children < 18 were living in the household. Perceived general health status was assessed with a 5-point scale ranging from excellent to poor health. Women were also asked to indicate all the

types of insurance coverage they had (including Medicaid, Medicare, private, and other insurance) and whether any of their insurance plans was a health maintenance organization, preferred provider organization, or other type of managed care plan. Participants also indicated whether they had been uninsured at any point during the previous year. The total number of health care visits during the year, length of time seeing the regular provider, reason for the most recent health care visit (grouped as prenatal or postpartum care, routine examination or screening tests, treatment for a new health problem or injury, or follow-up care for an ongoing health problem), propensity to seek care (women who seek care as soon as possible are compared to women who wait for some length of time), and type of health care provider (generalist versus specialist) were also assessed. The majority of women reporting that their regular provider was a specialist rather than a generalist reported that an OB/GYN was their regular physician (67.4%).

Analysis

Data from the three CoE clinic samples and three community comparison samples were combined. Bivariate differences among women seen in CoEs and women seen in the community comparison settings are examined using chi-square tests for categorical variables and the independent groups *t*-test for continuous variables. Similarly, within the CoE and community samples, differences in the characteristics of women who had a preference for a female physician and those who did not were tested.

To evaluate the first study hypothesis, effects of the CoE in the original evaluation are compared to the effects for the subset of women who saw female physicians. The merged data from the three community and CoE comparison sites are analyzed using logistic regression modeling with listwise deletion. Adjusted odds ratios (OR) and 95% confidence intervals (CI) for the effect of being in the CoE versus the community comparison sample are reported. Indicator variables for the communities from which samples were drawn are included in all regression models. Two sets of models are estimated. The first set replicates the analyses conducted in the original evaluation. Variables adjusted for in this analysis are region, age, education, perceived health status, and managed care enrollment. These variables are important to control for because of their known relationships to receipt of primary health care services and to satisfaction with health care (Anderson et al., 2002).

A second set of multivariate regression models are estimated to evaluate the second study hypothesis. These models examine the CoE effect on quality of care outcomes while controlling for physician gender preference and other provider use covariates. Variables that differed significantly between the CoE and

Table 1. Physician gender and physician gender preferences^a

	Community (<i>n</i> = 611)	CoE (<i>n</i> = 618)
Regular physician is female (%)	31.59*	64.89*
Women who have a female regular physician (<i>n</i>)	193	401
Prefer a female physician (%)	51.30	55.61

^aDifferences in physician gender and preferences were tested with the Pearson chi-square test. Significant differences ($p < .05$) are indicated with an asterisk (*).

community comparison samples were assessed for collinearity and contribution to variance explained. A parsimonious set of variables was identified for inclusion in the final models. The additional provider use covariates are specialty of the regular physician, health care seeking attitude, and length of time with the regular physician. These controls are added to the models to further account for potential selection bias in the sample of women seen in CoEs versus other

sites in the community. All data are analyzed using Stata version 7.0 (StataCorp, 2001).

Results

More women in the CoE reported that they had a female regular physician (64.9%) than women attending other health care sites in the same communities (31.6%) (Table 1). Women attending the CoE are also slightly older (Table 2). This age difference corresponds to a higher proportion of women in the CoE insured by Medicare, in fair or poor health, and making more than five health care visits in the past year. A higher percentage of women in the CoE seek health care as soon as possible and have a regular physician who is not a generalist compared to women in the community comparison group.

The proportion of women who expressed a preference for a female physician did not differ between samples, nor were there many differences between

Table 2. Sociodemographic and health care access characteristics by physician gender preference among women who have a female physician in the community and CoE clinic samples

	Community (<i>n</i> = 193) ^a		CoE (<i>n</i> = 401) ^a	
	Prefer female ^b	Do not prefer female	Prefer female ^b	Do not prefer female
Demographics				
Mean age (SD) [range 18–94] #	43.84* (14.74)	49.13* (16.37)	49.69* (20.25)	54.48* (19.40)
High school education or less (%)	30.30	35.87	24.65	28.25
White, non-Hispanic (%)	81.63	89.13	84.19	88.07
Married and living with partner (%)	66.67	64.13	59.66	56.07
Overall health status fair or poor (%) #	7.07	10.87	15.21	17.61
Income (%)				
≤\$20,000	22.34	21.19	9.52	16.00
\$20,001–\$40,000	25.00	23.18	23.81	30.67
\$40,001–\$75,000	30.32	29.80	34.52	29.33
≥\$75,001	22.34	25.83	32.14	24.00
Access and utilization of health care				
Health insurance type (%)				
Private #	73.74	62.77	59.64	56.18
Medicare #	11.11	17.02	25.56	32.02
Medicaid	8.08	7.45	6.73	8.43
Uninsured	7.07	12.77	8.07	3.37
Insured women in managed care (%)	82.02	80.52	75.78	80.53
With regular physician				
≥2 years (%) #	82.83	78.72	50.56	44.80
Five or more health care visits in last year ^c (%) #	36.36	50.00	59.64	67.42
Type of regular physician (%)				
Generalist #	90.91	90.43	59.19	61.24
OB/GYN #	3.03	1.06	30.49	26.97
Other #	6.06	8.51	10.31	11.80
Seek medical care as soon as possible (%) #	8.08	17.20	16.13*	24.57*
See an OB/GYN in addition to regular physician (%)	Not available	Not available	6.28*	12.36*

^aDifferences between women in the community sample and the CoE comparison sample were tested using the chi-square test for categorical variables and the independent groups *t*-test for continuous variables. Significant differences ($p < .05$) are indicated with the pound symbol (#).

^bDifferences between women who do and do not have a preference for a female physician were tested within the community sample and the CoE comparison samples using the chi-square test for categorical variables and the independent groups *t*-test for continuous variables. Significant differences ($p < .05$) are indicated with asterisks (*).

^cAll women in the study made at least one primary health care visit in the past year.

Table 3. Logistic regression estimates of the effect of the CoE on screening, counseling, and satisfaction equivalent to the original evaluation and limited to women who had a female regular physician^a

	CoE Effect	
	Original evaluation (<i>n</i> = 1,229) Adjusted Odds Ratio (95% CI)	Women with a female physician (<i>n</i> = 594) Adjusted Odds Ratio (95% CI)
Clinical services		
Routine physical examination	1.10 (0.76, 1.59)	0.59 (0.29, 1.21)
Papanicolaou test, past 3 years	1.69 (1.03, 2.78)*	1.57 (0.74, 3.30)
Physical breast examination, past year	2.27 (1.58, 3.27)***	2.67 (1.45, 4.90)**
Mammogram, ≥50, past year	3.17 (1.90, 5.30)***	3.88 (1.61, 9.33)**
Cholesterol test, past 5 years	0.79 (0.56, 1.11)	0.87 (0.49, 1.54)
Colon cancer screening, ≥50, past 5 years	1.52 (1.03, 2.26)*	1.40 (0.73, 2.66)
Counseling topics (past 12 months)		
Diet and weight	1.0 (0.80, 1.26)	1.30 (0.90, 1.86)
Exercise	0.87 (0.69, 1.10)	0.98 (0.68, 1.41)
Importance of calcium intake	0.90 (0.71, 1.14)	0.85 (0.59, 1.22)
Hormone replacement therapy, ≥40	1.46 (1.07, 2.00)*	1.38 (0.84, 2.26)
Alcohol and drugs	2.06 (1.54, 2.75)***	1.99 (1.27, 3.10)**
Domestic violence	2.21 (1.57, 3.11)***	1.60 (0.95, 2.66)
Sexually transmitted diseases	2.41 (1.65, 3.53)***	2.30 (1.24, 4.27)**
Preventing unintended pregnancy, 18–44	2.25 (1.44, 3.52)***	1.95 (0.96, 3.96)
Family or relationship concerns	1.59 (1.17, 2.16)**	1.37 (0.86, 2.18)
Sexual function or concerns	2.11 (1.50, 2.97)***	2.54 (1.44, 4.47)**
Satisfaction with care coordination and comprehensiveness		
High satisfaction	2.58 (1.93, 3.46)***	2.77 (1.75, 4.38)***

p* < .05;*p* < .01;****p* < .001.^aThe control variables and outcomes are equivalent to the original evaluation analysis. Logistic regression odds ratios adjusted for age, education, enrollment in a managed care plan, perceived health status, and site.

women who preferred a female physician and those who did not (Table 2). The mean age of women who preferred a female physician was lower in both the CoE and community samples. Among women in the CoE sample, slightly more women who did not express a preference for a female physician would seek care for a medical problem as soon as possible rather than delaying. In addition, more of the women in the CoE who did not have a preference for a female physician reported seeing an OB/GYN in addition to a generalist for regular care (this information was not available in the community survey).

Hypothesis 1. Table 3 presents results from the original evaluation and results from equivalent multivariate logistic regression models estimated on the subsample of women with a female physician. Higher odds of receiving recommended services and counseling were associated with being seen in a CoE site even when the analysis was limited to women with a female regular physician. Women in CoEs were more likely to report having received a physical breast examination in the past year (OR = 2.67, *p* < .01) and women ages 50 and over were more likely to have received a mammogram (OR = 3.88, *p* < .01). Three

counseling topics more likely to be discussed when women were seen in the CoE, even when the analysis was limited to female physicians: alcohol and drugs (OR = 1.99, *p* < .01); sexually transmitted diseases (OR = 2.30, *p* < .01); and sexual functions or concerns (OR = 2.54, *p* < .01). Women seen in the CoEs were also more likely to report high satisfaction with care (OR = 2.77, *p* < .001). Significant CoE effects that were present in the original evaluation, but did not remain in the equivalent analyses among women seeing female physicians were: Pap test, colon cancer screening, hormone replacement therapy counseling, domestic violence counseling, prevention of unintended pregnancy counseling, and family or relationship concerns counseling.

Hypothesis 2. Additional significant CoE effects were observed when the models containing only women seen by female physicians were adjusted for female provider preference and other possible sources of selection bias. Women seen in CoEs were more likely to receive domestic violence counseling (OR = 1.84, *p* < .05) and counseling on family or relationship concerns (OR = 1.95, *p* < .05). Counseling on alcohol and drugs was marginally significant (*p* = .05). Interest-

Table 4. Logistic regression estimates of the effect of the CoE on screening, counseling, and satisfaction among women with a female physician, adjusted for provider gender preference and additional provider use covariates^a (N = 594)

	CoE Effect Adjusted OR (95% CI)
Clinical services	
Routine physical examination	0.90 (0.38, 2.11)
Papanicolaou test, past 3 years	1.63 (0.66, 4.02)
Physical breast examination, past year	2.13 (1.03, 4.38)*
Mammogram, ≥50, past year	3.66 (1.29, 10.41)*
Blood pressure measurement	1.83 (0.87, 3.87)
Cholesterol test, past 5 years	0.71 (0.37, 1.33)
Colon cancer screening, ≥50, past 5 years	1.38 (0.66, 2.90)
Counseling topics (past 12 months)	
Diet and weight	1.14 (0.77, 1.68)
Exercise	0.95 (0.62, 1.47)
Importance of calcium intake	0.97 (0.65, 1.43)
Hormone replacement therapy, ages 40+	1.66 (0.95, 2.90)
Alcohol and drugs	1.67 (1.00, 2.82)
Domestic violence	1.84 (1.01, 3.34)*
Sexually transmitted diseases	2.51 (1.19, 5.26)*
Preventing unintended pregnancy, ages 18–44	2.01 (0.84, 4.82)
Family or relationship concerns	1.95 (1.13, 3.36)*
Sexual function or concerns	2.02 (1.05, 3.87)*
Stress management	1.34 (0.84, 2.13)
Satisfaction with care coordination and comprehensiveness	
High satisfaction	2.84 (1.69, 4.79)***

* $p < .05$; ** $p < .01$; *** $p < .001$.

^aOdds ratios are adjusted for age, education, enrollment in a managed care plan, perceived health status, preference for a female physician, type of regular physician (generalist versus specialist), length of time seeing physician, propensity to seek care, and site.

ingly, when physician specialty was removed from the models, receipt of the Pap test within the past 3 years and counseling on alcohol and drugs were significantly higher in the CoE (data not shown).

In summary, the results from a CoE effect was not upheld in analyses limited to women who saw female physicians for the Pap test, colon cancer screening, hormone replacement therapy counseling, and preventing unintended pregnancy counseling.

Discussion

The findings of this study confirm the overall findings of the original CoE evaluation. Namely, women seen in CoEs receive higher-quality care in certain areas than women seen in settings that are not so designated. The persistence of a CoE effect among women who saw female physicians strengthens the interpretation of the original CoE evaluation. Advantages experienced by women using CoEs may be attributed to the unique health care delivery model and focus on coordinated and comprehensive health care for women provided by the CoE, rather than the presence

of female physicians or preferences for female physicians. The hypothesis that CoE effects observed in the original evaluation might be attributed to physician gender was not upheld for breast cancer screening and detection, and counseling on domestic violence, STDs, sexual functions or concerns, and family or relationship concerns, or for satisfaction with care. These findings support the view that characteristics of the CoE settings, and not just the gender of the physicians in these settings, are responsible for higher quality of care for some measures.

The absence of significant CoE effects for a few of the services that were present in the original evaluation must be interpreted cautiously given the reduced power to detect differences in this subanalysis of women who had a female physician. The reduced power could have biased our results toward a finding of no difference between the CoE and community. Thus, the absence of a significant CoE effect in the current analysis could be due either to insufficient power or to the effect of seeing a female physician. Finding a CoE effect in our analysis rules out H_{A1} , but not detecting a CoE effect does not necessarily support H_{A1} . The colon cancer and cervical cancer screening findings observed in the original evaluation had lower effect sizes (.10 & .13 respectively) than the other screening findings that were upheld in this analysis of women seen by female physicians. Although there were some slight reductions in the size of odds ratios, suggesting small effects of provider gender, overall there were no prominent qualitative differences in odds ratios. Thus, differences in statistical significance from the original evaluation for these outcomes likely owe to the reduced power.

The inability to assess the influence of other potential sources of selection bias is a limitation of the evaluation study design that could have affected our results. Replication of the original evaluation findings for the subgroup of women seeing female physicians, however, addresses an important probable source of selection bias. Selection bias related to patient preferences for a female provider and provider use characteristics do not appear to have substantially influenced the original CoE evaluation results.

Receipt of the Pap test within the past 3 years and counseling on alcohol and drugs were significantly higher in the CoE when the specialty of the regular provider was not taken into account. Greater reliance on OB/GYNs for regular care in the CoE could account for the higher levels of cervical cancer screening in the CoEs in the original evaluation. The coordination of care and related opportunity to see OB/GYNs for regular health care visits may be an aspect of the CoE model that results in superior preventive care for women. The influence of OB/GYNs on quality outcomes in the CoE deserves further study.

Counseling on sensitive topics such as domestic

violence, sexually transmitted diseases, and sexual function or concerns is higher in CoE settings. The woman-friendly model of care in CoEs may help patients to feel comfortable talking about their concerns. Settings that are not explicitly dedicated to women's health care may be perceived by women as less able to address sensitive and gender-related concerns. The providers who work in these settings may be more attentive to psychosocial circumstances that affect women's lives and health by virtue of their exposure to research and the CoE model.

The findings of this study and the original CoE evaluation suggest that important improvements in women's primary health care have been achieved. Extending the benefits of the CoE model to more women, including women in traditionally underserved areas such as rural communities, deserves to be a high priority for women's health policy and health care quality improvement.

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